# APPENDICITIS

a thesis

by

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# APPENDICITIS.

## Introductory Remarks.

During the last few years there has probably been no ailment which has reached a higher position of notoriety among the general public than appendicitis. Even among the members of the medical profession the name of this disease was scarcely known fifteen years ago, while to-day it is considered as one of the commonest and most important of all intra-abdominal lesions.

To realise how rapidly this disease has been understood and mastered one must remember that it is only as recently as 1888 that Fitz advanced the radical but sound theory that diseases described as Typhlitis, Perityphlitis, Paratyphlitis, Appendicular Peritonitis, and Perityphlitic Abscess, were all varieties of one and the same affection, - namely Appendicitis.

Every year since that date the course and symptoms of the disease have become better known, its dangerous nature and frequent occurrence is now recognised, and the treatment of the disease and prevention of the same, has become a matter of great import. At present it appears as if before long it will be considered to be the exclusive property/

property of the surgeon, and the importance of its medical treatment is apt to be overlooked.

In bringing forward this subject as a thesis, I fear I can lay claim to nothing that is original, so thoroughly has the disease in all its aspects been worked out by a host of notable observers.

My experience has been taken from the ever-increasing number of cases that are to be met with in ones duties as a hospital resident, and in the rounds of private practice, and also from the fact that I have myself of late suffered from a severe attack of acute appendicitis with one or two mild recurrences of the same, for which I have just undergone operative treatment.

Apart from clinical experience, my knowledge of the appendix in its normal and abnormal conditions, and the references I make, are taken from the following able writers on the subject:-

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| Berry | (Appendix. vide Quain's Anatomy). |
| Deorer | (Treatise on Appendicitis). |
| Fowler | (Appendicitis). |
| Hare | (Practical Diagnosis). |
| Hawkins | (Diseases of Vermiform Appendix). |
| Mc'Adam & Eccles | (Lectures delivered at College of Surgeons 1903). |

Mynter/

Mynter (Appendicitis and its Surgical treatment).
Rose & Carters (Manual of Surgery).
Taylor (Practice of Medicine).
Treves (System of Surgery).
Tully (Appendicitis - Monograph).

and also from other minor sources of of information.

## HISTORY OF LESIONS OF VERMIFORM APPENDIX.

The earliest recorded account of any lesion connected with the Appendix Vermiformis may probably be accredited to Saracenus who in the year 1642 described an abscess in the right Iliac region with discharge of faecal matter together with 14 Lumbricoid worms.
A hundred years later Mestivier reported a case which had a fatal termination of an abscess to the right of the Umbilicus, which was caused by the perforation of the Vermiform Appendix owing to a pin which he found lodged there.

Weyeler in 1813 mentioned a case of a young man with symptoms (evidently those of appendicitis) which caused his death.

A post-mortem examination was made, and the coecum was found to be gangrenous, but the gangrene began at the base of the appendix which was correctly considered to be the first portion involved. A few years later/

years later both Louyer - Villernay and Metier describe the disease, and the subsequent peritonitis following on perforation of the appendix, though like all other writers of the time no attempt is made to differentiate diseases of the coecum from those of the appendix.

In 1837 Burne endeavours to shew that diseases affecting the appendix do not necessarily involve the coecum and he records cases where foreign bodies, such as cherry stones, raisin seeds and faecal matter were found in the lumen and which set up ulceration there, and subsequently gave rise to appendicitis.

Voltz in 1843, and Rokitansky in 1855 describe with considerable accuracy inflammation of the appendix, and the latter mentions that catarrhal inflammation may either lead to ulceration or assume a chronic morbid character. He also points out how that when the appendix is acutely inflamed, adhesions are wont to form so as to cut off the general peritoneal cavity from the local affected area.

In 1859 Leudet writing on appendicitis draws attention to the frequency of perforation of the appendix, and how such perforation may open into Coecum, Rectum, Vagina, Bladder or through abdominal wall.

Willard-Parker (of New York) in 1866 first proved the value of surgical interference in acute appendicitis.

In/

In 1888 the well known writings and work on this subject by Fitz and Sands were given to the world; and since Mc'Burney twelve years ago reported his successes by operation (24 serious cases with only one death), the term Appendicitis has become almost a household word, and the important position the disease holds among abdominal lesions has become fully recognised.

## GROSS ANATOMY OF VERMIFORM APPENDIX.

The vermiform appendix is a small worm-like structure attached to the lower and back part of the coecum. Its length is usually about 3 inches, but it may vary from one inch to as many as seven or more. Its diameter is about ¼ inch containing a lumen of small calibre in the centre. The axis is usually straight but may be slightly curved. It is soft and velvety in consistence, and of a yellow-pinkish colour.

The surface is smooth and regular, it slightly tapers towards its distant extremity.

It is entirely an intra-peritoneal organ, and if there are no adhesions the tip is quite free and mobile within the peritoneal cavity .

It is surrounded completely by mesentery, which is designated the meso-appendix.

R Berry (Edinburgh) who has so thoroughly worked out the anatomy of the appendix, in speaking of the meso-/

meso-appendix says it is "a double fold of peritoneum which entirely surrounds the vermiform appendix constituting its mesentery.

Though generally of a triangular aspect it is always quadrilateral in outline, that is to say four borders can always be described, though one border may be so short as to give one the impression that the structure is triangular.

In most cases the mesentery can be demonstrated to the naked eye extending along the whole length of of the appendix, and in those cases where the meso-appendix appears only to extend midway along the appendix, microscopic examination will conclusively prove that a peritoneal covering is investing the whole length of the appendix."

This is of importance, for (as Mc'Adam Eccles has pointed out) where the meso-appendix does not reach as a distal fold to the termination of the tube, the appendix gets curved or bent upon itself, which as will be shewn later on is one of the causes that predispose it to inflammation.

The position of the appendix in relation to the coecum is most valuable, so much so that it is impossible to say which is the normal direction in which the axis should lie. Most frequently it may be found pointing upwards and inwards, i.e. looking towards the spleen, this is known as the "North/

"North East" position.

The next most common position, is the "South East" where it points downwards and inwards over the brim of the pelvis.

The third site in which the appendix may be commonly found is looking directly upwards behind the Coecum, which is called the "North" position.

The appendix however may be found lying in almost any position, especially must this be borne in mind if there has been any previous inflammation of the structure.

Sometimes owing to its excessive length it may be found lying on the left side of the abdominal cavity; or there may be complete transposition of the viscera or even the coecum and appendix may be entirely displaced owing to their not having descended into the Iliac fossa.

## MICROSCOPIC ANATOMY OF VERMIFORM APPENDIX.

The histology of the appendix is similar to that of the large intestine.

These are serous, muscular, submucous and mucous coats.

The lumen is of small calibre but readily admits a bristle, probably in some conditions it is merely a potential space.

The mucous membrane lining the appendix is composed/

composed of delicate retiform connective tissue, which contains within its meshes numerous lymphoid cells, and is furnished with a plentiful supply of solitary and Lieberkuhn's Glands.

This richness in lymphoid tissue is observable only in the appendices of young subjects, disappearing rapidly as age advances, till in late life the structure so atrophies as to more or less completely obliterate its lumen, and the whole appendix to become of very insignificant appearance.

A similar obliteration and disappearance of lymphoid tissue is apt to take place after the structure has been subject to inflammation.

The opening between the coecum and the appendix can easily be demonstrated; within the coecum there is a small prominence of Mucous Membrane which surrounds the aperture and which is thought by some to act like a valve ( valve of Gerlach ).

The position of this orifice in relation to the lumen of the appendix is interesting, for it will be observed that it is so placed that it is difficult for foreign bodies to enter the appendix.

PHYSIOLOGY OF THE VERMIFORM APPENDIX.

In the rabbit and hare and some other herbivora the distal end of the coecum is very large and richly endowed with masses of lymphoid tissue and in these animals/

animals it undoubtedly has an important part to play in the digestive economy; but whether the vermiform appendix which is all that remains of the enlarged coecum of the lower animals has a similar function, it is difficult to ascertain. Probably not.

On account of its richness in lymphoid tissue and the fact of its disappearance in later life, it has been thought that it may have some action like the tonsils, and by some has been called an "Intestinal Tonsil." There is nothing to warrant such a belief. Other observers have thought it may have the power of producing sulphuretted Hydrogen ($H_2$ S.) but the theory is hardly tenable.

It may have a slight absorptive power, but its surface is infinitesimal.

In the foetus a thick odourless fluid has been found in it, but no meconium.

At the present date most physiologists look upon the appendix as functionless, - a rudimentory organ, a remnant of development, in fact a mere relic of a previous condition!

## INFLAMMATION OF THE VERMIFORM APPENDIX.

Roughly speaking all inflammatory lesions of the appendix may be classified as either:-

(1) Acute Appendicitis.

(2) Chronic Appendicitis.

under/

Under the former heading are placed Catarrhal , Ulcerative and gangrenous Appendicitis; while Recurrent and Relapsing Appendicitis are discussed with the Chronic form.

## BACTERIOLOGY OF APPENDICITIS.

Before proceeding to the general causation of this disease it will be well to bear in mind that all inflammation of the Appendix must be looked upon as directly or indirectly the result of Bacterial invasion.

The Bacillus coli communis is always to be found during an attack of appendicitis. It is true that this bacillus is to be met with in appendices which are perfectly healthy, but if the organ is inflamed the bacilli are seen in excessive quantities, and appear at such a time to acquire especial virulence.

The Bacilli Pyocyaneus and Prodigiosous are also to be found during an attack of appendicitis.

The Tubercle Bacillus may give rise to tuberculosis of the appendix, but it is doubtful whether primary tuberculosis of the structure occurs.

Where however the Ileo-coecal region is in a state of tuberculous ulceration the appendix is usually also involved (vide Fenwick & Dodswell, Lancet II 133 1892).

The typhoid Bacillus may also be present in the appendix during an inflammatory attack.

The/

The most malignant forms of appendicitis appear to be those in which mixed injection occurs.

The Staphylococcus Pyogenes Aureus and albus with various streptococci are commonly met with.

Even the pneumococcus may be present, while Actinomycosis has on more than one occasion given rise to appendicitis (vide. Medical Press and Circular Dec 1902.)

Neoplasms of various forms occasionally invade the vermiform appendix.

The Bacillus coli communis is however the chief aggressor in appendicitis, and sometimes is the only micro-organism present during an attack.

Possibly it is on account of the fact that the structure is practically functionless and that its trophic power is so low, that it appears to have so very little power to resist the onslaught of bacteria. In any case the micro-organisms once they get a hold, so to speak, appear to have a special power of multiplying themselves and becoming unusually malignant.

It is for this reason that it is so impossible to foretell what will be the prognosis of any given attack of appendicitis.

The initial symptoms may be very slight, so as to give use to the supposition that the attack will be of a very mild character, and yet within 48 hours on account of the peculiar virulence of the bacilli and the /

and the almost devitalised state of the tissue they are dealing with, a gangrenous form of appendicitis may have declared itself.

As Mr Hawkins of St. Thomas' Hospital says, in speaking of the Vermiform appendix its proneness to injective inflammation of this sort lies "in that subtle structure which determines the degree of resistance of a tissue to a disease. One man differs from another in his power of resistance; the more degenerate the man the less resistance can he exert.

In like manner one organ differs from another and in the appendix we are dealing with an organ which is degenerate and functionless from first to last, and its scanty power of resistance to bacterial invasion is but another way of expressing this fact.

## CAUSATION OF APPENDICITIS.

Of the causes that bring about an inflammation of the appendix some, such as age, sex, and nationality etc. of a patient must be looked upon as predisposing towards the diseases, while others are of more direct or exciting nature.

AGE. Appendicitis is essentially a disease of young persons. The vast majority of cases occur before the age of 30, and where primary attacks are reported as occuring in persons above this age, the possibility/

possibility of a previous attack being overlooked must not be forgotten. Attacks of appendicitis are often so slight as hardly to be noticed by the patient who may merely consider himself to be suffering from a "bout of biliousness."

Appendicitis usually makes its first appearance between the ages of 15 and 25.

The reason for this appears to lie in the fact that at this period the appendix is very rich in lymphoid tissue and the mucous secretion that is produced by the sore, under certain conditions becomes a ready nidus in which bacteria can grow.

After the age of 30 the lymphoid tissue atrophies and the appendix tends to obliterate itself.

Also it must be remembered that it is during the period of adolescence that indiscretions of diet are more frequently indulged in, and the subsequent intestinal catarrhs are of more frequent occurrence. Also it is at this age before the system reaches its full strength, that the modest habits of life are more irregular and individuals are more exposed to the chills and rigours of inclement weather than are those who have reached a more mature age.

Sex. The frequency with which appendicitis occurs in the male as compared with the female is very curious.

According to statistics the disease is four times more/

more frequent in males.

This is especially remarkable because constipation, with neglect of the state of the Alimentary Canal (which are certainly important predisposing causes of Appendicitis) is a common failing among women. Some authorities attribute it to the fact that the appendix of the female has a better blood-supply as it receives an additional arterial twig from the right Ovarian Artery.

CLIMATE. As a predisposing cause climate does not seem an important factor, except that damp weather following closely upon a spell of dry sunshiny weather is very apt in some people to cause a gastro-intestinal catarrh and this latter has an important bearing upon the disease.

NATIONALITY. The great number of cases of Appendicitis reported from the United State of America at first sight make one inclined to believe that nationality must have something to do with the prevalence of the disease.

Probably the reason is to be found in the somewhat peculiar dietaries of the citizens of the United States.

As is well known they are apt, owing to the constant stress under which they live, to partake of their meals hurriedly, or the food itself is of a highly spiced and ofter irritating nature.

In other countries/

In other countries where persons suffer as much from dyspeptic troubles, one would expect a similar large number of cases of appendicitis. Also one must not forget that it is in America that the subject of appendicitis has been most thoroughly worked out, and that until recently the disease was more accurately diagnosed there than elsewhere, so that old statistics of the comparison of the frequency of the disease among different nations are of little value.

FOREIGN BODIES IN THE VERMIFORM APPENDIX.

The presence of a foreign body in the lumen of the appendix must be looked upon as a serious predisposing cause, and also is of itself frequently an exciting cause of appendicitis. The presence of such foreign bodies is however of not common occurrence.

The position of entrance and the lie of the axis of the appendix are all against the possibility of extraneous matter entering the organ, while Gerlach's valve and the peristaltic contractile power of the appendix are of assistance in preventing foreign bodies finding a resting place there.

In spite of this however such substances as orange pips, small shot, pins etc. frequently do lodge in the appendix.

They may remain here without doing any damage for an unlimited length of time, as is well illustrated by the case of a young soldier of the Rifle Brigade/

Brigade who died recently in South Africa from Enteric fever; the autopsy in which case disclosed a perfectly healthy appendix containing a large piece of solder, evidently from a corned-beef tin!

On the other hand a foreign body may cause immediate abrasion of the endothelial lining of the tube, and go on rapidly to ulceration or gangrene.

It may at other times remain inert for an indefinite period and then suddenly either from traumatism or other obscure cause lead to a lesion of an inflammatory nature.

Sometimes foreign bodies lodged in the appendix act as the starting point of a calculus, and it is only when the concretion becomes of a certain size, that symptoms will be felt.

Concretions which become impregnated with lime salts may form within the appendix without any apparent cause. These may be single or multiple, if multiple they may be separated from one another in small loculi, but if they lie together they will be "facetted" as is the case with gall stones. Such calculi are a great source of danger, as by their mechanical action they are capable of being the starting point of serious mischief. Inspissated mucous is often found within the appendix.

In the first instance this probably consisted of/

of some normal secretion within the appendix, which in the healthy state is emptied into the coecum; Should the peristaltic action of the appendix for any reason be in abeyance, either owing to the vis-a-tergo being too weak or the vis-a-fronte being too strong, this mucous secretion collects and forms in time a semi- solid mass of inspissated mucous.

Sometimes such masses resemble"date-stones" or the like, and have indeed been mistaken for them.

They are a suitable nidus in which bacteria may grow and thus may become a fruitful source of inflammation.

At other times calcium salts, chiefly the phosphates and oxalates get deposited in them and give rise to calculi as mentioned above.

Intestinal worms occasionally find a habitat in the Vermiform Appendix. Faecal concretions may also be met with in the appendix.

SHORTNESS OF MESO-APPENDIX, such an anatomical defect appears to have an important bearing as predisposing towards appendicitis. When the mesentery has a shortened attachment the structure is of necessity curved upon itself. This kinking may vary much in extent, at times it may be so excessive that secretion or any extraneous matter which may find its way into the lumen, may not be thrown off by the appendix , as would have been the case could the structure have straightened itself out.

Of/

Of other predisposing causes the fact of the appendix having previously been the seat of an inflammatory lesion is the most important.

Habitual constipation and irregularity of the action of the bowels also influence the causation of appendicitis.

Dysentery, Enteric and dyspepsia in so much as they weaken the general resistive power of the alimentary canal must also be mentioned.

Of the exciting causes of appendicitis the first place is taken by the presence of Intestinal Catarrh. Such as is caused by any slight ptomaine poisoning, catching cold, or such as is produced by the ingestion of unsuitable food.

The appendix shares in such a catarrh, but being a cul-de-sac the consequences are more serious, and should any occlusion of the orifice occur as may happen when the mucous membrane forming "Gerlachs valve" is congested, the contents of the lumen of the appendix get pent up, and the proper drainage of the organ is at a standstill.

It is in such cases that the ubiquitus Coli communis bacillus and any other pyogenic cocci that happen to be at hand, are apt to find their way in, and discovering a suitable medium multiply accordingly, in spite of the violent diarrhoea to which/

whole
which the tract is being subjected, the appendix itself becoming a sort of backwater in which inflammation proceeds apace.

Traumatism as an exciting cause is also of considerable moment, especially is this the case where the appendix contains calculi.

An injury by direct violence to the right Iliac region may under those conditions cause instantaneous intra-peritoneal rupture of the appendix. Also
has
where the tip of the appendix lies become bound down to the Psoas muscle; a sudden muscular movement may tear asunder adhesions which may give rise to dire results.

A muscular strain made while performing a golf "stroke" has been the exciting cause of appendicular inflammation.

FREQUENCY OF APPENDICITIS.

Before proceeding with the symptomatology of the disease it will not be out of place to discuss the very obvious frequency of occurrence of appendicitis.

It is only in comparatively recent years that the pathology of this complaint has been properly understood. On this account errors of diagnosis in the past were very great.

The old terms "Typhlitis","Colitis", "Perityphlitis" etc. were formerly used indiscriminately for any inflammatory lesion in the right Iliac fossa, whereas now-a-days the term "Appendicitis" has supplanted the above/

the above misleading names.

In this fashion although the laity consider that a new and terrible scourge has arisen among us, the medical profession are aware that a disease is being dealt with at the present time, which is more quickly recognised and more accurately diagnosed than formerly.

Among certain states and nations of Eastern Europe and other parts of the world, where Medical Science has not reached such a high standard as in more enlightened countries, one finds that the deaths recorded as due the "Peritonitis" in young men reach a very high figure.

Now it is a recognised fact the chief cause of peritonitis (especially in young men) is appendicitis so that the majority of such deaths, would in this country and America be classified as due to appendicitis. Similarly if all diseases and inflammatory lesions affecting the abdomen, among all nations, could be subjected to a certain standard of diagnosis it would undoubtedly be shown that appendicitis is a complaint more universal than has hitherto been supposed.

It must also be remembered that Appendicular catarrh may be of so slight a character as not to cause the patient sufficient inconvenience to call in a Medical attendant, and yet after death from some other cause, the post mortem examination shows decided inflammatory changes.

It/

It is often necessary to microscopically examine an Appendix before one can declare it is absolutely healthy or not.

The number of Appendices which are found Post Mortem to be diseased, although they never give rise to serious symptoms during life, is truly surprising.

Someone has said that probably every one is troubled with Appendicitis once in his life-time:- this of course is a gross exaggeration, but yet it may be that in future years many of the so-called "Stomach-aches" of children and the "bilious attacks" and "Colic" of adolescence will be more accurately diagnosed as appendicitis.

SYMPTOMS OF APPENDICITIS.

In the mildest form of appendicitis which takes the form of an inflammatory catarrh of the organ, either localised or part of a general intestinal catarrh the symptoms may be so slight as to cause only a slight temporary tenderness in the right Iliac fossa accompanied by some diarrhoea.

These attacks which are often the precursors of the more formidable forms of appendicitis are generally overlooked by the patient.

An ordinary acute attack of appendicitis is ushered in by some slight dyspeptic trouble with loss of appetite.

It/

It frequently commences quite suddenly and is accompanied usually by diarrhoea and nausea.

Very shortly afterwards the patient is seized with an acute pain in the abdomen. This pain is a cardinal symptom, its onset is very sudden, and may indeed be the first symptom noticed by the patient.

In other cases there is a clear history of preceding diarrhoea which may be of a griping nature. Constipation is not a frequent accompaniment of appendicitis.

The abdominal pain which is of a peculiar boreing character, always supervenes more or less rapidly and may be of such a severe nature as to completely prostrate the patient, producing in some cases profuse diaphoresis and even collapse.

At first it is usually referred to the Epigastrium or to the region of the Umbilicus, very soon however it shifts its position to the right Iliac fossa and at the same time may assume a colicky nature.

Though the exact site of the pain varies according to the length of the appendix and the direction in which it is lying, yet in the vast majority of cases the seat of the pain is identical, and the patient will point with unerring exactitude to a spot in the right Iliac fossa corresponding nearly to the middle part of a line drawn from the umbilicus to the anterior superior spinous process of the Ilium.

This/

This spot is known as "Mc.Burney's Point." With the localisation of pain to this region occurs the second constant and valuable symptom, namely tenderness.

In some cases local tenderness may be defined at "Mc.Burney's Point" before the pain has settled in that region. It varies much in amount, being more marked when the inflammation is more acute, while where suppuration has taken place it is often exquisite.

A third symptom is rigidly of the abdominal wall, and occurs concurrently with the pain and tenderness. This is as a rule of such a nature as to cause the patient to draw up his right leg in order to relax the abdominal muscles as much as possible. Such a position of decubitus is often of itself an important diagnostic sign.

Along with those three important symptoms occur several minor symptoms which are more or less constant.

Of these must be first of all noticed - nausea, this in some few cases may be very persistent, but as a rule passes off after the first twenty-four hours, and probably indicate that the peritoneum is involved in the inflammatory process that is taking place.

The tongue at this time is furred. The patient frequently complains, in the initial stages of the disease, of a pain shooting down the inside of the right thigh, and sometimed including the scrotum.

Should/

Should the affected appendix be dipping into the pelvis, bladder troubles may assert themselves , and the patient may complain of frequency of micturition, or in some cases of retention of urine.

The temperature of a patient suffering from appendicitis, does not give much clue as to the severity of the case. It varies very much in different cases and usually there is no excessive hyper-pyrexia, the thermometer ranging from 100° F to 102° F.

The pulse, unless perforation occurs, is accelerated in proportion as the temperature is elevated. Palpation of the abdomen may in some cases be almost prohibited on account of the pain it produces.

In the early stages of the disease a small circumscribed tumour may be felt, but this cannot be depended upon: it is caused by the higheraemic and congested condition of the structure and the local peritonitis and adhesions that are being produced.

In many cases after three or four days all these symptoms gradually subside, and at the end of eight days the patient has quite recovered.

If the appendix be examined in such a case, it will be found congested, with the lymph spaces full of round cells and the lumen denuded of its endothelium.

Where/

Where the case is more severe the inflammation may spread more deeply into the interstitial tissue and the corresponding local peritonitis which always takes place will be of a more extensive character and an abscess is apt to be formed.

The formation of pus is generally signalised by increasing distress on the part of the patient, and the symptoms become exaggerated, a rigor may occur and there may be a considerable rise of the temperature.

The tenderness is almost invariably increased and should the abscess cavity point towards the abdominal wall distinct fluctuation may be made out.

In those cases where the presence of pus is suspected, and yet the absence of fluctuation is a marked feature, or no tumour is to be felt through the abdominal wall, it must be remembered that this may be due to the fact that the pus is deeply shut off by adhesions, its position may be such as only to be reached per Vaginam or per Rectum and such an examination should never be neglected. The patient may now complain of severe headache the vomitting and nausea may be increased, while the patient assumes an anxious expression.

CONSTIPATION MAY BE MARKED AND IS A BAD SIGN.

The patient may begin to shew the signs of septic/

septic poisoning. The colicky nature of the pain however may subside when an abscess forms. The course the case will take can never be foretold, and when the patient appears to be at his worst and immediate perforation is expected, the temperature may suddenly drop to normal, the patient making an uninterrupted recovery. In others the case termin - ates by lysis. It is reasonable to suppose that, in such cases the pus is discharged through the normal aperture of the appendix into the coecum, or the abscess has burst into the bowel. In a few cases the pus may be absorbed. Where a gangrenous form of appendicitis occurs the course of the disease may be much shorter in duration, a climax being often reached on the 2nd or 3rd day, in these cases which usually have their origin in what is known as an ulcerative condition of the appendix, there has probably been mixed infection.

It is also seen when the appendicular well is much damaged or necrosed by the mechanical action of calculi.

A rapid gangrenous appendicitis may occur when the whole or part of the blood-supply of the organ is suddenly cut off, as may be induced by a sudden twisting or kinking of the same.

Where gangrene supervenes in a later stage of the disease/

the disease it is brought about by the high tension within the abscess cavity caused by the presence of the pus.

A sudden cessation of pain is often indicative of gangrene of the appendix.

The symptoms in any given case of appendicitis depend so entirely upon how securely the pus is enclosed within its abscess cavity; it may be large in amount and yet be so securely walled off that the patient may remain for days in a seemingly satisfactory condition without any high temperature or symptom of a serious nature, and may after continuing a week or so gradually be diminished and the patient do well as mentioned above, or it may burst with alarming suddeness, and bring about the speedy death of the patient.

In any case the sequel of the case depends upon what becomes of the pus. The abscess may assume large proportions and may burrow up and down the back of the abdomen, reaching as high as the liver on the one hand, or down behind the rectum on the other.

Sooner or later if the patient does not succumb to septicaemia or an outlet be made for the pus, the abscess will rupture spontaneously and the contents escape in the following directions:-

(1)/

(1) through Abdominal Wall

(2) into Coecum

(3) Peritoneal Cavity

(4) Pleural Cavity

(5) ascending Colon

(6) Rectum

(7) Ileum

(8) Bladder

(9) Uterus.

(This order of sequence is taken from the statistics of Ball, Langheld, Einhorn Krafft & Paulier).

CHRONIC APPENDICITIS.

An appendix that has been once the seat of an inflammatory lesion, is extremely susceptible to further attacks of bacteria.

In some cases however an attack of the disease in its acute form may bring about complete occlusion of the lumen of the tube, or this may happen after repeated attacks of the same.

In either case if the occlusion is complete, it may be looked upon as a spontaneous cure, and is called "obliterating Appendicitis."

Where the appendix has its walls partly bound together by adhesions and only partially obliterated, it is apt to give rise to repeated attacks of appendicitis,/

appendicitis, often little pockets of pus remain behind, which may for months or even years lie quiescent, but every now and then give rise to an acute exacerbation of the disease.

Sometimes indeed the appendix is found in a state of Cystic dilatation.

Such attacks are known as "Recurrent Appendicitis."

At other times the patient never properly gets well after the primary attack, but is apt to suffer from sharp pain which may occur more or less regularly every few days, or he may in some cases be constantly aware of a persistent 'boreing' pain in the right Iliac fossa.

Such a condition is usually referred to as "Relapsing Appendicitis." This classification is however entirely arbitrary, and the two forms may merge into one another.

Patients who are the subject of chronic appendicitis are often subject to a low form of anaemia probably caused by a gradual septic poisoning induced by the absorption of pus and septic material from the appendix which may be in a state of chronic catarrh.

Many patients however are between the attacks of appendicitis in perfect health.

In some cases there has been noticed a liability to articular pains, in those patients who suffer from the/

the chronic form of the disease.

DIAGNOSIS OF APPENDICITIS.

The ordinary acute form of appendicitis giving rise to pain and tenderness at Mc'Burnery's point with rigidity of the abdominal does not give much difficulty as to forming an accurate diagnosis.

In those cases however where the pain and tenderness are referred to some other part of the abdomen the diagnosis is by no means so easy.

In cases of doubt, a rectal or vaginal examination may prove of great assistance.

Appendicitis, in the early stages where the pain is referred to the pit of the stomach, and where there is much gastro-intestinal disturbance, is frequently mistaken for acute indigestion.

A differential diagnosis from gastric ulcer is readily made from the long history of dyspepsia that usually precedes the latter complaint.

A gastric ulcer which has perforated may however require more care to eliminate.

Intestinal colic differs in that pressure and the recumbent position afford relief, though often flatus and faeces which have accumulated in the coecum may give rise to symptoms closely simulating appendicitis.

The absence of a rise in temperature in the former,/

former, will render clear the nature of the case.

Enteric fever should be diagnosed by the well known preceding symptoms, headache malaise and the like, while Widal's reaction may serve as a confirmatory test, and after a few days the presence of a rash and splenic enlargement will prevent an error in diagnosis being made.

The greatest difficulty however may lie between an acute attack of appendicitis and acute obstruction especially if this latter is in the region of the Ileo- coecal valve.

The acute onset, local pain and vomitting are common to both.

The presence of any fever here will at once incline towards the complaint being appendicitis; while the nature of the vomitting (later becoming stercoraceous) and the absence of flatus or faeces per rectum or in other cases the presence of a sanguineous discharge, will point to some form of intestinal obstruction.

The frequency of micturition or retention of urine which may occur in appendicitis is often very misleading, While renal colic and a movable kidney may prove a stumbling block to the unwary.

Uretites or the impaction of a calculus in the right ureter may produce symptoms exactly like an acute /

acute or chronic appendicitis. The history of a previous attack of the disease goes strongly in the favour of a diagnosis of appendicitis. An appendix that has once been inflamed can often be felt through the abdominal wall. It is doubtful whether a healthy appendix can be palpated.

Psoas abscess should be diagnosed from appendicitis , by finding the presence of diseased vertebrae, while the leg is not drawn up.

Painful menstruation , Salpingitis and ovarian trouble must be eliminated by a careful attention to the previous history and a thorough pelvic examination.

The value of estimating the amount of leucocytosis as a means of diagnosing the presence of pus in the later stages of appendicitis, has important bearing upon its treatment, and will be discussed under that heading.

PROGNOSIS OF APPENDICITIS.

One cannot foretell with certainty the result of any given attack.

Mild initial symptoms may be the forerunner of a most virulent form of appendicitis.

As Mr. Hawkins says "there is no disease more protean in its nature." An inflamed appendix may at any moment resolve itself or proceed to rapid perforation without any timely warning.

Probably/

Probably over 90 per cent of all cases of appendicitis make a good recovery.

In hospitals, where the worst cases of the disease are to be met with, the mortality is considerably higher. Thus statistics collected for 7 years in the Royal Infirmary, Edinburgh, shew that 25 per cent of cases had a fatal termination.

In St. Bartholomew's and St.Thomas' Hospital the mortality from appendicitis is about 20 per cent.

The chances of a patient having a return of the disease, after the organ has been once affected are very great.

Mr Anderson of Nottingham considers that 75 per cent of the cases have one or more recurrent attacks.

This probably is a little high, but certainly 50 per cent of all cases recur.

It is impossible to say whether a second attack will be more serious than the first, or whether or not the appendix is likely to obliterate itself after repeated attacks.

The prognosis of appendicitis is certainly good but as Mr Morris of New York says, an inflamed appendix is like " a cap which sometimes snaps, sometimes flashes, and sometimes causes an explosion, and none of us can tell in advance just what is going to happen."

TREATMENT OF APPENDICITIS.

Bearing/

Bearing in mind the uncertainty of the course of an attack of acute appendicitis and the unhappy termination which may follow upon initial symptoms of a very mild type, it behoves that the medical attendant should exercise great care in the treatment, and watch carefully the whole progress of each case he deals with.

The very mild cases do not often present themselves for treatment, the patient believing himself to be suffering from some passing dyspeptic derangement.

In the ordinary acute attack, the first object is to obtain rest in the recumbent position for the patient.

Secondly some means must be found to allay the pain from which he is suffering; this may be accomplished by the application of ice to the affected region, or the constant application of hot fomentations.

In many cases however the pain is so severe that it is imperative for an opiate to be used, the best form being salts of morphia hypodermically.

There is of course considerable danger that by giving narcotics the peristaltic action of the bowel will be lessened, and the pain so reduced that the symptoms may be completely masked.

In spite of this the judicious use of opium is one/

one, that cannot possibly in many cases be withheld.

The tension of the abdominal muscles may be relieved by raising and supporting the right leg with pillows.

The next step is to thoroughly empty the lower bowel by means of copious enemata. These should never be omitted however much the patient may have complained previously of diarrhoea.

The use of aperients is still with many authorities a vexed question, Osler (Principles and Practice of Medicine) especially, argues strongly against their use. In spite however of such able testimony, aperients in the initial stages of the disease should always be given.

The advantages derived from clearing out the alimentary canal in appendicitis far outweigh the disadvantages.

It is true that every endeavour should be made to keep the parts at rest as much as possible, so that adhesions may form, which may keep the affected area localised from the general peritoneal cavity; and there is a danger also that the increased tension caused by increased peristalsis may cause pre-existing adhesions to break down or even bring about the rupture of an abscess cavity.

In/

In spite of this, saline purges , or better still castor oil should be given as soon as the case is diagnosed.

The benefit that accrues from this practice is very great.

The intestine is cleared of all irritating matter, bacteria and their products being disposed of wholesale.

The appendix shares in the increased peristalsis and it is often enabled to rid itself of its contents through its natural exit, which before it had been unable to accomplish either from the fact that the aperture was blocked, or that the lumen was so full of foul material that its muscular walls were in a state of paralytic dilatation.

The immediate effect of an aperient may be cessation of the agonising spasmodic pain from which the patient had been suffering, while the appendix was vainly attempting to discharge itself.

As regards the further treatment of the case the main feature is that of watchful inactivity. Hyperpyrexia seldom causes any alarm.

The vomitting generally passes off after the first few hours, but should it be persistent no nourishment should be given by the mouth, and the patient should be allowed to suck a little ice.

If/

If it still continues much benefit will be derived from occasionally washing out the stomach.

Severe cephalalgia and the sleeplessness which frequently accompanies it should be treated with Potassium Bromide or some such sedative.

The use of Phenacetin and Phenazonum often give much relief.

The symptoms gradually subside as the febrile conditions abate.

Until the patient's temperature has reached the normal state and the pulse corresponds thereto, he should be kept on a milk diet.

While the great majority of cases of appendicitis terminate satisfactorily, some, in spite of all that the physician can do, will end fatally.

It has been proved that this death-rate can be still further reduced by judicious surgical interference.

Hence it becomes of greatest importance to exactly realise when in the interests of the patient the assistance of a surgeon will be required.

Any local collection of pus should at once be an indication for operative treatment.

Similarly a sudden cessation of pain in the course of acute illness, probably indicates the presence of gangrene and should be treated without delay/

delay.

In those cases where nothing definite of what is taking place can be made out, the position of the medical attendant is a very trying one. The danger of allowing an abscess to burst intra-peritoneally are very great, but so also are the dangers which will result from performing a laparotomy and opening into an abscess which may be entirely shut off by adhesions from the general peritoneal cavity.

It is far better however to err on the side of obtaining assistance too soon than waiting till perforation has occurred, when it may be too late.

In America and Germany acute inflammation of the appendix is often treated as a surgical ailment from the very commencement of the attack; even in more conservative England there is a certain school of men who advocate appendiceotomy, should the symptoms not abate within 48 hours.

Such drastic treatment is unwise and unnecessary, and as Sir Frederick Treves says, -

" the almost reckless and injudicious manner in which the appendix is being excised at the present day is doing a great deal to bring the operation into discredit."

One must rely upon the strength and condition of the patient, the pulse is a great guide as to whether perforation has taken place or not.

In determining the presence of pus and whether

or not it is increasing in quantity, a "leucocyte count" is of great value. Unfortunately it is not an entirely reliable test, but may be of great help in assisting other diagnosis. Its value depends upon the fact that when suppuration is taking place to any extent, an increased leucocytosis is apt to occur in the blood.

As the amount of suppuration increases in quantity, the more numerous will be the leucocytes. Thus at the beginning of an attack of appendicitis, should the blood of the patient be examined, the leucocytes will be found normal in number ( viz.7000 to 9000 per C.M.M.) but if an appendicular abscess should form, the white cells immediately become more numerous, and as suppuration advances from day to day so will an extra two or three thousand leucocytes be found daily in the blood, until in some cases the enormous total of 30,000 per C.M.M. Though marked leucocytosis indicates the presence of pus the converse does not hold true. This may be accounted for, by the fact that an abscess cavity may be completely walled off by adhesions, so that little or no absorption can take place, and consequently no blood reaction. Also it must be remembered that in those cases where the patient is too weak to react to the toxaemia/

toxaemia from which he is suffering, an examination of the blood will reveal no change.

The treatment of Chronic Appendicitis resolves itself into giving what relief that is possible when exacerbations of the disease occur: and in the interval, of keeping the alimentary canal in as healthy a condition as possible, and above all upon insisting on a regular daily action of the bowels.

Where the pain is of such a character as to prevent the patient satisfactorily continuing his duty or where the patient has had more than one return of the disease, the advisability of appendicectomy must be laid before him.

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